

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Thin Upland

Site ID: R053CY012SD

Major Land Resource Area (MLRA): 53C – Southern Dark Brown Glaciated Plains



Physiographic Features

This site occurs on slightly sloping to steeply sloping uplands.

Landform: escarpment, ridge, moraine, valley side, plain, hill

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1,300	2,300
Slope (percent):	5	33
Water Table Depth (inches):	80	80
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	Very high

Climatic Features

MLRA 53C is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the Northern Great Plains and air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation typically ranges from 18 to 22 inches per year. The average annual temperature is about 45°F. January is the coldest month with average temperatures ranging from about 15°F (Stephan, South Dakota (SD)), to about 16°F (Onida 4 NW, SD). July is the warmest month with temperatures averaging from about 72°F (Stephan, SD), to about 74°F (Onida 4 NW, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 58°F. This large annual range attests to the continental nature of this area's climate. Hourly winds are estimated to average about 12 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 11 mph during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of cool-season plants begins in early to mid-March, slowing or ceasing in late June. Warm-season plants begin growth about mid-May and continue to early or mid-September. Greenup of cool-season plants may occur in September and October when adequate soil moisture is present.

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	125	141
Freeze-free period (days):	142	160
Mean Annual Precipitation (inches):	18	22

Average Monthly Precipitation (inches) and Temperature (°F):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.25	0.56	3.6	26.4
February	0.37	0.57	7.8	30.9
March	1.02	1.04	19.5	43.1
April	1.68	3.01	31.0	58.7
May	2.68	3.35	42.6	70.1
June	3.17	3.41	53.3	79.1
July	2.50	3.34	58.7	88.7
August	1.73	2.06	56.8	87.6
September	1.94	2.48	47.3	77.3
October	1.35	1.67	33.7	62.3
November	0.52	0.77	20.8	42.4
December	0.21	0.34	8.5	31.2

Climate Stations		Period	
Station ID	Location or Name	From	To
SD3608	Harrold 12 SSW	1963	2008
SD6292	Onida 4 NW	1913	2008
SD7992	Stephan	1903	2008
SD9077	Wessington Springs 7 SW	1948	1998

For local climate stations that may be more representative, refer to <http://www.wcc.nrcs.usda.gov>.

Riparian and Wetland Features

No riparian areas or wetland features are directly associated with this site.

Representative Soil Features

The features common to soils in this site are the loam to silt loam textured surface layers and slopes of 5 to 33 percent. The soils in this site are well-drained and formed in loamy till or loess. The surface layer is 3 to 11 inches thick. The texture of the subsurface layers ranges from loam to silty clay loam. The soils have a slow to very slow infiltration rate. These soils are typically calcareous at or near the surface. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

These soils are susceptible to wind and water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Loss of 50 percent or more of the surface layer of the soils on this site can result in a shift in species composition and/or production.

Access Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/>) for specific local soils information.

Parent Material Kind: loess, loamy till, clayey till
Parent Material Origin:
Surface Texture: loam, clay loam, clayey
Surface Texture Modifier: none
Subsurface Texture Group: clay loam
Surface Fragments ≤3” (% Cover): 0-0
Surface Fragments >3” (%Cover): 0-2
Subsurface Fragments ≤3” (% Volume): 0-9
Subsurface Fragments >3” (% Volume): 0-27

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	very slow	slow
Depth (inches):	80	80
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	6.6	8.4
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	6	7
Calcium Carbonate Equivalent (percent)*:	0	30

*These attributes represent from 0-40 inches or to the first restrictive layer.

Plant Communities

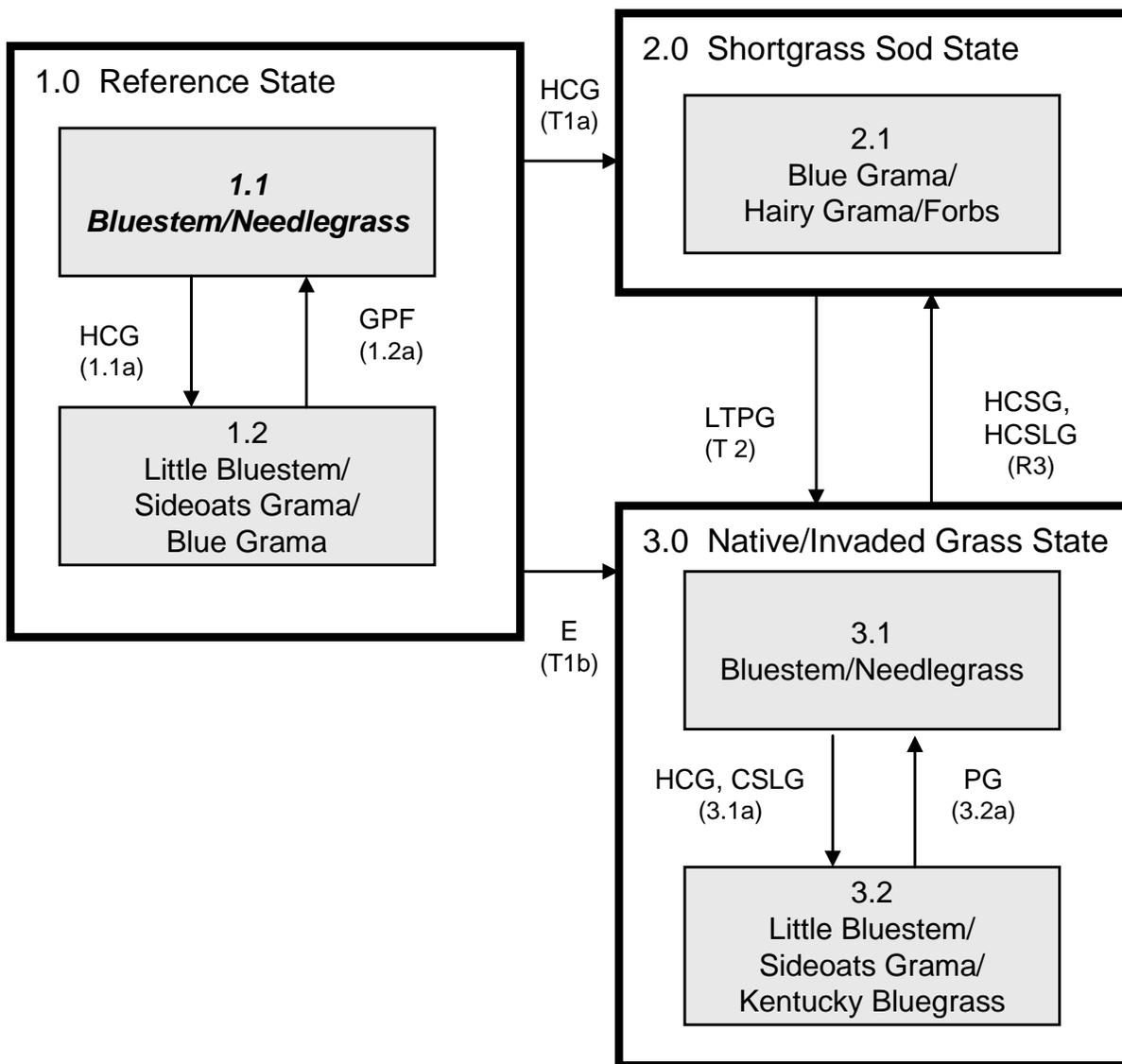
Ecological Dynamics of the Site

This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), and other biotic and abiotic factors that typically influence soil/site development. Calcium Carbonate (CaCO₃) is generally present beginning at three to six inches below the soil surface and also distinguishes the Thin Upland Ecological Site (ES). Many types of native vegetation have varying levels of tolerance to calcium carbonate, and therefore have different responses. Vegetation such as big bluestem, little bluestem, and needlegrasses have a high tolerance to calcium carbonate, while species such as switchgrass has a very low tolerance. This results in an expression of big bluestem, little bluestem, and needlegrasses with a decrease in switchgrass and smooth brome. Carbonates near the surface of the soil tightly bind micronutrients making them less available to plants, and creating plant-level deficiencies of some nutrients. As a consequence, native species, which are better adapted to environmental stress tolerance, continue to occupy the site and exotic species that generally exploit deep and nutrient-rich soils (such as smooth brome) are less-likely to invade. Changes will occur in the plant community due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions that will occur, severe disturbances, such as periods of well below average precipitation, can cause significant shifts in plant communities and/or species composition.

Interpretations are primarily based on the 1.1 Bluestem/Needlegrass Plant Community Phase. It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant community phases, states, transitional pathways, and thresholds have been determined through similar studies and experience. Due to a general invasion of exotic species (such as Kentucky bluegrass and smooth brome) across the MLRA within this site, returning to the 1.1 Bluestem/Needlegrass Plant Community Phase may not be possible.

The following is a diagram that illustrates the common plant community phases that can occur on the site and the transition pathways between communities. These are the most common plant community phases based on current knowledge and experience, and changes may be made as more data is collected. Narratives following the diagram contain more detail pertaining to the ecological processes.

Plant Communities and Transitional Pathways



Refer to narrative for details on pathways: **C** – Cropped, abandoned; **CSLG** – Continuous season-long grazing; **E** – Encroachment of introduced species; **GPF** – Grazing, precipitation, and/or fire returning to more normal disturbance regime levels and frequencies; **HCG** – Heavy continuous grazing; **HCSG** – Heavy continuous seasonal grazing; **HCSLG** – Heavy continuous season-long grazing; **LTPG** – Long-term prescribed grazing; **PG** – Prescribed grazing; **S** – Seeding.

Any Plant Community

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	1.1 Bluestem/Needlegrass			
			Group	lbs./acre	% Comp	
GRASSES & GRASS-LIKES				2040 - 2280	85 - 95	
TALL WARM-SEASON GRASSES			1	480 - 840	20 - 35	
big bluestem	Andropogon gerardii	ANGE	1	360 - 840	15 - 35	
switchgrass	Panicum virgatum	PAVI2	1	24 - 120	1 - 5	
Indiangrass	Sorghastrum nutans	SONU2	1	0 - 120	0 - 5	
prairie sandreed	Calamovilfa longifolia	CALO	1	0 - 120	0 - 5	
tall dropseed	Sporobolus compositus var. compositus	SPCOC2	1	0 - 72	0 - 3	
MID WARM-SEASON GRASSES			2	480 - 840	20 - 35	
little bluestem	Schizachyrium scoparium	SCSC	2	360 - 840	15 - 35	
sideoats grama	Bouteloua curtipendula	BOCU	2	120 - 360	5 - 15	
plains muhly	Muhlenbergia cuspidata	MUCU3	2	0 - 120	0 - 5	
prairie dropseed	Sporobolus heterolepis	SPHE	2	0 - 120	0 - 5	
COOL-SEASON BUNCHGRASSES			3	240 - 432	10 - 18	
porcupine grass	Hesperostipa spartea	HESP11	3	120 - 360	5 - 15	
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	0 - 360	0 - 15	
green needlegrass	Nassella viridula	NAV4	3	0 - 240	0 - 10	
Canada wildrye	Elymus canadensis	ELCA4	3	0 - 72	0 - 3	
WHEATGRASS			4	48 - 240	2 - 10	
western wheatgrass	Pascopyrum smithii	PASM	4	48 - 240	2 - 10	
slender wheatgrass	Elymus trachycaulus	ELTR7	4	0 - 120	0 - 5	
SHORT WARM-SEASON GRASSES			5	48 - 192	2 - 8	
blue grama	Bouteloua gracilis	BOGR2	5	48 - 192	2 - 8	
buffalograss	Bouteloua dactyloides	BODA2	5	0 - 120	0 - 5	
hairy grama	Bouteloua hirsuta	BOHI2	5	0 - 72	0 - 3	
OTHER NATIVE GRASSES			6	24 - 96	1 - 4	
prairie junegrass	Koeleria macrantha	KOMA	6	24 - 72	1 - 3	
Scribner panicum	Dichanthelium oligosanthes var. scribnerianum	DIOLS	6	0 - 48	0 - 2	
Wilcox panicum	Dichanthelium wilcoxianum	DIW5	6	0 - 48	0 - 2	
other grasses		2GRAM	6	0 - 96	0 - 4	
GRASS-LIKES			7	24 - 120	1 - 5	
sedge	Carex spp.	CAREX	7	24 - 120	1 - 5	
other grass-likes		2GL	7	0 - 72	0 - 3	
FORBS			9	120 - 240	5 - 10	
American pasqueflower	Pulsatilla patens ssp. multifida	PUPAM	9	0 - 48	0 - 2	
American vetch	Vicia americana	VIAM	9	0 - 24	0 - 1	
catclaw sensitive briar	Mimosa nuttallii	MINU6	9	24 - 48	1 - 2	
cudweed sagewort	Artemisia ludoviciana	ARLU	9	24 - 48	1 - 2	
dotted gayfeather	Liatris punctata	LIPU	9	24 - 48	1 - 2	
goldenrod	Solidago spp.	SOLID	9	24 - 48	1 - 2	
heath aster	Symphyotrichum ericoides	SYER	9	0 - 48	0 - 2	
Indian breadroot	Pediomelum esculentum	PEES	9	0 - 24	0 - 1	
Lambert crazyweed	Oxytropis lambertii	OXLA3	9	0 - 24	0 - 1	
prairie coneflower	Ratibida columnifera	RACO3	9	24 - 48	1 - 2	
prairie spiderwort	Tradescantia occidentalis	TROC	9	0 - 24	0 - 1	
purple coneflower	Echinacea angustifolia	ECAN2	9	24 - 96	1 - 4	
purple prairie clover	Dalea purpurea	DAPU5	9	24 - 48	1 - 2	
scarlet gaura	Gaura coccinea	GACO5	9	0 - 24	0 - 1	
scurfpea	Psoraleidum spp.	PSORA2	9	24 - 48	1 - 2	
stiff sunflower	Helianthus pauciflorus	HEPA19	9	24 - 72	1 - 3	
wavyleaf thistle	Cirsium undulatum	CIUN	9	0 - 48	0 - 2	
western ragweed	Ambrosia psilostachya	AMPS	9	0 - 24	0 - 1	
native forbs		2FN	9	24 - 96	1 - 4	
SHRUBS			10	48 - 120	2 - 5	
fringed sagewort	Artemisia frigida	ARFR4	10	0 - 24	0 - 1	
leadplant	Amorpha canescens	AMCA6	10	24 - 96	1 - 4	
plains pricklypear	Opuntia polyacantha	OPPO	10	0 - 24	0 - 1	
rose	Rosa spp.	ROSA5	10	24 - 48	1 - 2	
western snowberry	Symphoricarpos occidentalis	SYOC	10	0 - 72	0 - 3	
other shrubs		2SHRUB	10	0 - 48	0 - 2	
Annual Production lbs./acre				LOW	RV	HIGH
GRASSES & GRASS-LIKES				1450	2136	2795
FORBS				105	180	275
SHRUBS				45	84	130
TOTAL				1600	2400	3200

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SYMBOL	1.1 Bluestem/Needlegrass			2.1 Blue Grama/Hairy Grama/Forbs			3.2 Little Bluestem/Sideoats Grama/Kentucky Bluegrass		
		Grp	lbs./acre	%Comp	Grp	lbs./acre	%Comp	Grp	lbs./acre	%Comp
GRASSES & GRASS-LIKES			2040 - 2280	85 - 95		1105 - 1235	85 - 95		1700 - 1900	85 - 95
TALL WARM-SEASON GRASSES		1	480 - 840	20 - 35	1	13 - 130	1 - 10	1	20 - 140	1 - 7
big bluestem	ANGE	1	360 - 840	15 - 35	1	13 - 91	1 - 7	1	20 - 140	1 - 7
switchgrass	PAW2	1	24 - 120	1 - 5				1	0 - 20	0 - 1
Indiangrass	SONU2	1	0 - 120	0 - 5						
prairie sandreed	CALO	1	0 - 120	0 - 5				1	0 - 40	0 - 2
tall dropseed	SPCOC2	1	0 - 72	0 - 3	1	0 - 65	0 - 5	1	0 - 100	0 - 5
MID WARM-SEASON GRASSES		2	480 - 840	20 - 35	2	65 - 195	5 - 15	2	400 - 600	20 - 30
little bluestem	SCSC	2	360 - 840	15 - 35	2	0 - 91	0 - 7	2	200 - 500	10 - 25
sideoats grama	BOCU	2	120 - 360	5 - 15	2	13 - 156	1 - 12	2	200 - 400	10 - 20
plains muhly	MJCU3	2	0 - 120	0 - 5				2	0 - 20	0 - 1
prairie dropseed	SPHE	2	0 - 120	0 - 5				2	0 - 40	0 - 2
COOL-SEASON BUNCHGRASSES		3	240 - 432	10 - 18	3	0 - 65	0 - 5	3	100 - 360	5 - 18
porcupine grass	HESP11	3	120 - 360	5 - 15				3	40 - 300	2 - 15
needleandthread	HECOC8	3	0 - 360	0 - 15	3	0 - 39	0 - 3	3	0 - 100	0 - 5
green needlegrass	NAV4	3	0 - 240	0 - 10	3	0 - 39	0 - 3	3	0 - 100	0 - 5
Canada wildrye	ELCA4	3	0 - 72	0 - 3				3	0 - 20	0 - 1
WHEATGRASS		4	48 - 240	2 - 10	4	0 - 65	0 - 5	4	0 - 200	0 - 10
western wheatgrass	PASM	4	48 - 240	2 - 10	4	0 - 65	0 - 5	4	0 - 200	0 - 10
slender wheatgrass	ELTR7	4	0 - 120	0 - 5				4	0 - 40	0 - 2
SHORT WARM-SEASON GRASSES		5	48 - 192	2 - 8	5	260 - 520	20 - 40	5	100 - 300	5 - 15
blue grama	BOGR2	5	48 - 192	2 - 8	5	195 - 325	15 - 25	5	100 - 200	5 - 10
buffalograss	BODA2	5	0 - 120	0 - 5	5	0 - 65	0 - 5	5	0 - 100	0 - 5
hairy grama	BOHI2	5	0 - 72	0 - 3	5	65 - 260	5 - 20	5	0 - 80	0 - 4
OTHER NATIVE GRASSES		6	24 - 96	1 - 4	6	13 - 65	1 - 5	6	20 - 100	1 - 5
prairie junegrass	KOMA	6	24 - 72	1 - 3	6	13 - 26	1 - 2	6	20 - 60	1 - 3
Scribner panicum	DIOLS	6	0 - 48	0 - 2	6	0 - 26	0 - 2	6	0 - 40	0 - 2
Wilcox panicum	DIW5	6	0 - 48	0 - 2	6	0 - 26	0 - 2	6	0 - 40	0 - 2
other grasses	2GRAM	6	0 - 96	0 - 4	6	0 - 65	0 - 5	6	0 - 100	0 - 5
GRASS-LIKES		7	24 - 120	1 - 5	7	130 - 260	10 - 20	7	60 - 240	3 - 12
sedge	CAREX	7	24 - 120	1 - 5	7	130 - 260	10 - 20	7	60 - 240	3 - 12
other grass-likes	2GL	7	0 - 72	0 - 3	7	0 - 65	0 - 5	7	0 - 60	0 - 3
NON-NATIVE GRASSES		8			8	26 - 130	2 - 10	8	100 - 400	5 - 20
annual bromegrass	BROMU				8	13 - 39	1 - 3	8	40 - 240	2 - 12
bluegrass	POA				8	13 - 130	1 - 10	8	60 - 360	3 - 18
FORBS		9	120 - 240	5 - 10	9	130 - 195	10 - 15	9	100 - 160	5 - 8
American pasqueflower	PUPAM	9	0 - 48	0 - 2				9	0 - 40	0 - 2
American vetch	VIAM	9	0 - 24	0 - 1				9	0 - 40	0 - 2
catclaw sensitive briar	MINU6	9	24 - 48	1 - 2				9	0 - 20	0 - 1
cudweed sagewort	ARLU	9	24 - 48	1 - 2	9	13 - 39	1 - 3	9	0 - 60	0 - 3
dotted gayfeather	LIPU	9	24 - 48	1 - 2				9	0 - 20	0 - 1
goldenrod	SOLID	9	24 - 48	1 - 2	9	13 - 65	1 - 5	9	20 - 60	1 - 3
heath aster	SYER	9	0 - 48	0 - 2	9	13 - 39	1 - 3	9	20 - 40	1 - 2
Indian breadroot	PEDIO2	9	0 - 24	0 - 1				9	0 - 20	0 - 1
Lambert crazyweed	OXLA3	9	0 - 24	0 - 1				9	0 - 20	0 - 1
prairie coneflower	RACO3	9	24 - 48	1 - 2	9	0 - 13	0 - 1	9	0 - 20	0 - 1
prairie spiderwort	TROC	9	0 - 24	0 - 1				9	0 - 20	0 - 1
purple coneflower	ECAN2	9	24 - 96	1 - 4	9	0 - 13	0 - 1	9	0 - 40	0 - 2
purple prairie clover	DAPU5	9	24 - 48	1 - 2				9	0 - 20	0 - 1
scarlet gaura	GACO5	9	0 - 24	0 - 1				9	0 - 20	0 - 1
scurfpea	PSORA2	9	24 - 48	1 - 2	9	13 - 39	1 - 3	9	20 - 60	1 - 3
stiff sunflower	HEPA19	9	24 - 72	1 - 3				9	0 - 40	0 - 2
wayleaf thistle	CIUN	9	0 - 48	0 - 2	9	0 - 13	0 - 1	9	0 - 40	0 - 2
western ragweed	AMPS	9	0 - 24	0 - 1	9	13 - 65	1 - 5	9	20 - 40	1 - 2
native forbs	2FN	9	24 - 96	1 - 4	9	0 - 39	0 - 3	9	20 - 60	1 - 3
introduced forbs	2FI				9	13 - 130	1 - 10	9	20 - 100	1 - 5
SHRUBS		10	48 - 120	2 - 5	10	13 - 65	1 - 5	10	0 - 100	0 - 5
fringed sagewort	ARFR4	10	0 - 24	0 - 1	10	13 - 65	1 - 5	10	0 - 60	0 - 3
leadplant	AMCA6	10	24 - 96	1 - 4				10	0 - 20	0 - 1
plains pricklypear	OPPO	10	0 - 24	0 - 1	10	0 - 26	0 - 2	10	0 - 60	0 - 3
rose	ROSA5	10	24 - 48	1 - 2	10	0 - 13	0 - 1	10	20 - 40	1 - 2
western snowberry	SYOC	10	0 - 72	0 - 3	10	0 - 26	0 - 2	10	0 - 60	0 - 3
other shrubs	2SHRUB	10	0 - 48	0 - 2	10	0 - 26	0 - 2	10	0 - 40	0 - 2
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
GRASSES & GRASS-LIKES			1450 - 2136 - 2795		675 - 1099 - 1510		1405 - 1820 - 2210			
FORBS			105 - 180 - 275		115 - 163 - 220		95 - 130 - 180			
SHRUBS			45 - 84 - 130		10 - 39 - 70		0 - 50 - 110			
TOTAL			1600 - 2400 - 3200		800 - 1300 - 1800		1500 - 2000 - 2500			

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value. Refer to PLANTS database for scientific names and codes: <http://plants.usda.gov>

Plant Community and Vegetation State Narratives

Reference State (State 1)

This state represents the natural range of variability that dominated the dynamics of this ES. This state was dominated by warm-season grasses, with cool-season grasses being subdominant. In pre-European times, the primary disturbance mechanisms for this site in the reference condition included periods of below and/or above average precipitation, periodic fire, and herbivory by insects and large ungulates. Timing of fires and herbivory coupled with weather events dictated the dynamics that occurred within the natural range of variability. Cool-season and taller warm-season grasses would have declined and a corresponding increase in short, warm-season grasses would have occurred. Today, a similar state (State 3) can be found on areas that are properly managed with grazing and/or prescribed burning and sometimes on areas receiving occasional short periods of rest. These sites are differentiated by the presence of exotic species such as Kentucky bluegrass and smooth brome. On most Thin Upland ESs within this MLRA, these species have invaded and are now present. It is likely that attaining the reference state as it is described here (without the presence of exotic herbaceous species) is not possible.

1.1 Bluestem/Needlegrass Plant Community Phase

Interpretations are based primarily on the 1.1 Bluestem/Needlegrass Plant Community Phase (this is also considered to be climax). The potential vegetation was about 90 percent grasses or grass-like plants, 7 percent forbs, and 3 percent shrubs. The community was dominated warm-season grasses, with cool-season grasses being subdominant. The major grasses included little bluestem, big bluestem, porcupine grass, needle-and-thread, and sideoats grama. Other grass or grass-like species included western wheatgrass, plains muhly, Canada wildrye, prairie sandreed, switchgrass, Indiangrass, blue grama, and sedges. This plant community was resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allowed for high drought tolerance. This was a sustainable plant community in regards to site/soil stability, watershed function, and biologic integrity.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD5304

Growth curve name: Southern Dark Brown Glaciated Plains, warm-season dominant, cool-season subdominant.

Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	17	25	25	15	7	1	0	0

Transitions or pathways leading to other plant communities were as follows:

- 1.1a – Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing will shift this community to the 1.2 Little Bluestem/Sideoats Grama/Blue Grama Plant Community Phase.

1.2 Little Bluestem/Sideoats Grama/Blue Grama Plant Community Phase

This plant community evolved under heavy continuous grazing or from over utilization during extended drought periods. The potential plant community was made up of approximately 85 percent grasses and grass-like species, 10 percent forbs, and 5 percent shrubs. Dominant grasses included little bluestem, blue grama, sideoats grama, sedge, and porcupine grass. Grasses of secondary importance included big bluestem, western wheatgrass, green needlegrass, and needleandthread.

Forbs commonly found in this plant community included cudweed sagewort, prairie coneflower, and western yarrow. This plant community had similar plant composition to the 3.2 Little Bluestem/Sideoats Grama/Kentucky Bluegrass Plant Community Phase (refer to the plant composition tables). The main difference is that this plant community phase did not have the presence of nonnative invasive species such as Kentucky bluegrass and smooth brome.

When compared to the 1.1 Bluestem/Needlegrass Plant Community Phase, cool-season and tall warm-season grasses have been reduced. Sideoats grama, blue grama, and sedges increased. Big bluestem, western wheatgrass, porcupine grass, and green needlegrass decreased, and production of mid and tall warm-season grasses were also reduced. This plant community was moderately resistant to change. The herbaceous species present were well adapted to grazing; however, species composition could be altered through long-term overgrazing. If the herbaceous component was intact, it tended to be resilient if the disturbance was not long-term.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD5305

Growth curve name: Southern Dark Brown Glaciated Plains, warm-season dominant.

Growth curve description: Warm-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	5	15	25	30	15	7	1	0	0

Transitions or pathways leading to other plant communities are as follows:

- 1.2a – Grazing, Precipitation, and/or Fire returned to normal disturbance regime levels and frequencies, along with precipitation and periodic light to moderate grazing with possible periodic rest shifts this community to the 1.1 Bluestem/Needlegrass Plant Community Phase.

Transitions from Reference State (State 1) to Shortgrass Sod State (State 2.0)

- T1a – Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing shifts this community to the 2.0 Shortgrass Sod State.

Transitions from Reference State (State 1) to Native/Invaded State (State 3.0)

- T1b – Encroachment of nonnative species such as Kentucky bluegrass and smooth brome, in combination of disruption of natural regimes (typically fire suppression following settlement) will shift this plant community to the 3.0 Native/Invaded Grass State.

Shortgrass Sod State (State 2)

This plant community evolved under heavy continuous grazing or from over utilization during extended drought periods. Extended drought attributes to and may hasten the transition to this state. This state is characterized by a dominance of sod forming, short growing grasses. Heavy, repeated continuous grazing eventually reduces the vigor and occurrence of the tall and mid grasses characteristic of the 1.0 Reference Plant Community. Low growth forms and low and late extending growing points allow blue grama, buffalograss, and upland sedges to tolerate and sometimes avoid heavy continuous grazing. Low desirability by herbivores also results in an increase in plants such as threeawn, sageworts, cactus, and various unpalatable forb or shrub species. The potential plant community was made up of about 85 percent grasses or grass like species, 10 percent forbs, and 5 percent shrubs. Dominant grasses are blue grama, hairy grama, sedges, and forbs. Dominant forbs include cudweed sagewort, cactus, fringed sagewort, and yarrow.

When compared to the 1.1 Bluestem/Needlegrass Plant Community Phase, mid- and tall grasses have decreased significantly. This plant community phase is very resistant to change and the herbaceous species tolerate heavy grazing use. This plant community yields significantly less biomass than most other plant community phases found on this site. A thick “sod” of blue grama and hairy grama reduces the opportunity for other species to establish on this site. Changes occur very slowly with long-term prescribed grazing. In many cases, renovation may be the only feasible alternative to return this state to a state resembling the 3.0 Native/Invaded Grass State.

2.1 Blue Grama/Hairy Grama/Forbs Plant Community Phase

This plant community evolved under heavy continuous grazing or from over utilization during extended drought periods. The potential plant community is made up of approximately 85 percent grasses and grass-like species, 10 percent forbs, and 5 percent shrubs. Dominant grass and grass-like species typically included blue grama, hairy grama, and forbs. Forbs and shrubs commonly found in this plant community include cudweed sagewort, fringed sagewort, green sagewort, and western yarrow. When compared to the 1.1 Bluestem/Needlegrass Plant Community Phase, blue grama, hairy grama, and sedge are dominant on this plant community. Tall and mid-grasses decreased significantly. This vegetation state was very resistant to change. The herbaceous species present are well adapted to grazing. This plant community is less productive than other phases. The thick sod increases runoff and prevented other species from getting established.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD5305

Growth curve name: Southern Dark Brown Glaciated Plains, warm-season dominant.

Growth curve description: Warm-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	5	15	25	30	15	7	1	0	0

Transitions from Shortgrass Sod State (State 2) to Native/Invaded State (State 3)

- T2a – Long Term Prescribed Grazing with moderate stocking levels coupled with adequate recovery periods, or grazing systems such as high-density, low-frequency, etc., intended to treat specific species or periodic light to moderate stocking levels including possible rest periods will shift this community to the 3.0 Native/Invaded State. Pest management may also be needed to suppress invasive grasses. Success depends on whether native reproductive propagates remain intact on site and may take a long period of time (10 years or more). Recovery may not be attainable.

Native/ Invaded Grass State (State 3)

This state represents the more common range of variability that exists with higher levels of grazing management but in the absence of periodic fire due to fire suppression. This state is dominated by cool and warm-season grasses. It can be found on areas that are properly managed with grazing and/or prescribed burning and sometimes on areas receiving occasional short periods of rest. Taller species can decline and a corresponding increase in short statured grass will occur.

3.1 Bluestem/Needlegrass Plant Community Phase

This plant community phase is similar to the 1.1 Bluestem/Needlegrass Plant Community Phase but it also contains minor amounts of nonnative invasive grass species such as Kentucky bluegrass and smooth brome (up to about 20 percent by air-dry weight). The potential vegetation is about 85 percent grasses or grass-like plants, 10 percent forbs, and 5 percent shrubs. The community is dominated by warm-season grasses with cool-season grasses being subdominant.

The major grasses include little bluestem, big bluestem, porcupine grass, green needlegrass, and sideoats grama. Other grass or grass-like species include needleandthread, western wheatgrass, plains muhly, Canada wildrye, prairie sandreed, switchgrass, Indiangrass, blue grama, Kentucky bluegrass, and sedges. This plant community is resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community in regards to site/soil stability, watershed function, and biologic integrity.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD5304

Growth curve name: Southern Dark Brown Glaciated Plains, warm-season dominant, cool-season subdominant.

Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	17	25	25	15	7	1	0	0

Transitions or pathways leading to other plant communities are as follows:

- 3.1a – Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing or Continuous Season-Long Grazing utilizing available forages through the majority of the growing season in the absence of adequate rest periods and livestock grazing returning year after year will shift this plant community to the 3.2 Little Bluestem/Sideoats Grama/Kentucky Bluegrass Plant Community Phase.

3.2 Little Bluestem/Sideoats Grama/Kentucky Bluegrass Plant Community Phase

This plant community is a result of heavy continuous grazing, continuous season-long grazing or from over utilization during extended drought periods. The potential plant community is made up of approximately 85 percent grasses and grass-like species, 10 percent forbs, and 0 to 5 percent shrubs. Dominant grasses include little bluestem, sideoats grama, blue grama, and Kentucky bluegrass. Grasses of secondary importance include needleandthread, big bluestem, buffalograss, smooth brome, and sedge. Forbs commonly found in this plant community include cudweed sagewort, fringed sagewort, prairie coneflower, and western yarrow.

When compared to the 1.1 Bluestem/Needlegrass Plant Community Phase, western wheatgrass, sideoats grama, and sedges increase. Big bluestem, porcupine grass, and blue grama decreased, and production of mid- and tall warm-season grasses is also reduced. This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:

Growth curve number: SD5304

Growth curve name: Southern Dark Brown Glaciated Plains, warm-season dominant, cool-season subdominant.

Growth curve description: Warm-season dominant, cool-season subdominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	7	17	25	25	15	7	1	0	0

Transitions or pathways leading to other plant communities are as follows:

- 3.2a – Prescribed Grazing that includes alternating season of utilization while providing adequate rest recovery periods of periodic light to moderate grazing will shift this plant community to the 3.1 Bluestem/Needlegrass Plant Community Phase.

Restoration Pathway from Native/Invaded State (State 3) to Shortgrass State (State 2)

- R3 – Heavy Continuous Seasonal Grazing with stocking levels well above carrying capacity for extended portions of the growing season, and at the same time of year, each year, or Heavy Continuous Season-Long Grazing with stocking levels well above carrying capacity utilizing available forage through the majority of the growing season in the absence of adequate rest periods, grazing at the same period each year will shift this plant community to the 2.0 Shortgrass Sod State.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Bluestem/Needlegrass Plant Community Phase (1.1):

Little Bluestem/Sideoats Grama/Blue Grama Plant Community Phase (1.2):

Blue Grama/Hairy Grama/Forbs Plant Community Phase (2.1):

Bluestem/Needlegrass Plant Community Phase (3.1):

Little Bluestem/Sideoats Grama/Kentucky Bluegrass Plant Community Phase (3.2):

Animal Preferences (Quarterly – 1,2,3,4[†])

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grasslikes							
big bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
blue grama	U D P U	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
buffalograss	U U D U	N U D U	U U D U	N U D U	N U D U	U U D U	U U D U
Canada wildrye	U D U U	N U N N	U D U U	N U N N	N U N N	U D U U	U D U U
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
Indiangrass	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
little bluestem	U D D U	N D N N	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
porcupine grass	U P U D	N D N U	U P U D	N D N U	N D N U	U P U D	U P U D
prairie dropseed	N U P U	N U D U	N U P U	N U D U	N U D U	N U P U	N U P U
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
sand dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
Scribner panicum	U U D U	N U N N	U U D U	N U N N	N U N N	U U D U	U U D U
sedge	U D U D	U P N D	U D U D	U D U D	U D U D	U D U D	U D U D
sideoats grama	U D P U	U P D U	U D P U	U P D U	U P D U	U D P U	U D P U
switchgrass	U D D U	U D U U	U D D U	N N N N	N N N N	U D D U	U D D U
tall dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
western wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
Wilcox panicum	U U U U	N U N N	U U U U	N U N N	N U N N	U U U U	U U U U
Forbs							
American pasqueflower	N N N N	N U N N	N N N N	N U N N	N U N N	N N N N	N N N N
American vetch	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
cudweed sagewort	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U D U
dotted gayfeather	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
goldenrod	U U D U	N U U N	U U D U	N U U N	N U U N	U U D U	N U U N
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
Indian breadroot	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
Lambert crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
prairie spiderwort	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
purple coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
purple prairie clover	U D P U	U P P U	U D P U	U P P U	U P P U	U D P U	U P P U
scarlet gaura	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
stiff sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western ragweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
Shrubs							
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
leadplant	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
plains pricklypear	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
rose	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic

[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this ES description). Because of this, a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Bluestem/Needlegrass (1.1):	2,400	0.66
Blue Grama/Hairy Grama/Forbs (2.1):	1,300	0.36
Little Bluestem/Sideoats Grama/Kentucky Bluegrass (3.2):	2,000	0.55

*Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25 percent harvest efficiency (refer to United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) National Range and Pasture Handbook).

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is typically dominated by soils in hydrologic group B. Infiltration and runoff potential for this site varies from moderate to high depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where shortgrasses form a strong sod and dominate the site. Dominance by blue grama, buffalograss, bluegrass, and/or smooth brome grass will result in reduced infiltration and increased runoff. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting, hiking, photography, bird watching, and other opportunities. The wide varieties of plants that bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

No appreciable wood products are typically present on this site.

Other Products

Seed harvest of native plant species can provide additional income on this site.

Supporting Information

Associated Sites

Clayey (R053CY011SD), Loamy (R053CY010SD), Loamy Overflow (R053CY020SD)

Similar Sites

(R053CY010SD) – Loamy [less little bluestem; higher production]

Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range-trained personnel were also used. Those involved in developing this site include: Stan Boltz, Range Management Specialist (RMS), NRCS; Shane Deranleau, RMS, NRCS; Mitch Faulkner, RMS, NRCS; and Kelly Stout, RMS, NRCS.

State Correlation

This site has been correlated in SD in MLRA 53C.

Field Offices/Counties

Chamberlain	Brule/Buffalo	Huron	Beadle	Plankinton	Aurora
Faulkton	Faulk	Miller	Hand	Selby	Walworth
Gettysburg	Potter	Onida	Sully	Wessington Springs	Jerauld
Highmore	Hyde	Pierre	Hughes		

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 42a – Missouri Coteau, 42e – Southern Missouri Coteau, 42f – Southern Missouri Coteau Slope.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://hpccsun.unl.edu>).

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://www.wcc.nrcs.usda.gov>).

USDA, NRCS. National Range and Pasture Handbook, September 1997.

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>).

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS, Various Published Soil Surveys.

Site Description Approval

SD, State Range Management Specialist

Date